Notes on *Eucalyptus* series *Orbifoliae* (Myrtaceae) including a new species from central Australia

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Abstract

Nicolle, D. Notes on *Eucalyptus* series *Orbifoliae* (Myrtaceae) including a new species from central Australia. *Nuytsia* 13(3): 487–493 (2001). A key and distribution map for all taxa of *Eucalyptus* ser. *Orbifoliae* Brooker & Hopper are provided. *Eucalyptus minniritchi* Nicolle is described to accommodate populations of mallees in central Australia previously referred to as *E. orbifolia* F. Muell. or *E. websteriana* Maiden and related to both. The new species differs from *E. orbifolia* in the smaller buds with a short hemispherical operculum, the smaller and narrower adult leaves and the generally smaller, hemispherical fruits and differs from *E. websteriana* in the consistently and strongly pruinose adult parts and generally coarser leaves, peduncles, pedicels, buds and fruits. *E. lata* L.A.S. Johnson & K.D. Hill, a species recently described to accommodate what is here recognized to be typical *E. orbifolia*, is synonymised with that earlier named species. The status of *E. educta* L.A.S. Johnson & K.D. Hill and its relationship to *E. orbifolia* is discussed.

Introduction

Populations of mallees from central Australia described here as the new species *Eucaluptus minniritchi* have previously been attributed to *E. orbifolia* (Chippendale 1988; Brooker & Kleinig 1990, 1994) or to *E. websteriana* Maiden (Boomsma 1981). Chippendale (1981) in the treatment of *Eucalyptus* for "Flora of Central Australia" included both *E. orbifolia* and *E. websteriana* as well as "*E.* aff. *orbifolia*" for populations of mallees that are here recognized to represent a single taxon in central Australia. Hill & Johnson (1992) recognized the distinctiveness of the central Australian populations in comparison with those of the goldfields of Western Australia. However, they erroneously referred the central Australian populations to typical *E. orbifolia*, despite correctly citing the type locality from the original publication as southern Western Australia. The authors simultaneously erected a new species, *E. lata*, to accommodate the Western Australian goldfields populations. Nicolle (1997) in recognizing the nomenclatural error of Hill and Johnson, included the central ranges populations with typical goldfields *E. orbifolia*, but stated that the central ranges population may represent a distinct taxon. Further field collections and research have indicated that the central ranges populations and goldfields populations are sufficiently distinct to warrant taxonomic recognition.

Taxonomic treatment

Eucalyptus series **Orbifoliae** Brooker & Hopper, *Nuytsia* 9(1): 40 (1993). *Type: Eucalyptus orbifolia* F. Muell.

A small series of nine taxa (six species and three subspecies), all except one species endemic to Western Australia. All taxa are restricted to granite outcrops or otherwise rocky areas on skeletal soils, except for *E. ewartiana* Maiden which may also occur in gravelly sands in more or less flat landscapes.

The series is distinguished by its combination of mallee or scraggy tree habit; presence of a lignotuber; distinctive minniritchi-type bark; absence of pith glands; bisected cotyledons; broad juvenile leaves; dull, slightly blue-green to greyish adult leaves; 3–7-flowered inflorescences; ovules in four vertical rows; pale creamy-yellow flowers and level to ascending broad disc on the fruit.

The term 'Minni Ritchi' [minniritchi] was first proposed to describe this distinctive 'crisped' bark type in eucalypts by Brooker & Hopper (1982) but has long been widely used to describe the superficially very similar bark type in some *Acacia* species. The minniritchi bark type in eucalypts is distinctive and characterized by smooth bark that is not fully deciduous but decorticates from the edges of thin longitudinal strips. These strips become curled inwards from the edges and remain attached to the stem. The partially attached curled bark is coppery or reddish-brown in colour exposing younger greenish or yellowish non-curled bark beneath.

Key to taxa of *Eucalyptus* series *Orbifoliae*

1. Leaves on mature plant sessile ..... **E. crucis** subsp. **crucis**
1. Leaves on mature plant petiolate
2. Adult leaves lanceolate, tapering to a point
3. Operculum longer than hypanthium; juvenile leaves sessile
4. Fruits 8–13 mm long, 14–20 mm diam. ..... **E. crucis** subsp. **praecipua**
4. Fruits 7–8 mm long, 10–14 mm diam. ..... **E. crucis** subsp. **lanceolata**
3. Operculum equal to or shorter than hypanthium; juvenile leaves petiolate ..... **E. ewartiana**
2. Adult leaves obovate to orbicular, emarginate or rounded
5. Operculum conic to beaked, 8–16 mm long
6. Operculum > 3 times as long as wide ..... **E. educta**
6. Operculum < 3 times as long as wide ..... **E. orbifolia**
5. Operculum rounded, 3–6 mm long
7. Fruits 7–10 mm long; plant prominently pruinose ..... **E. minniritchi**
7. Fruits 5–7 mm long; plant not or lightly pruinose
8. Branchlets & buds lightly pruinose ..... **E. websteriana** subsp. **websteriana**
8. All parts non-pruinose ..... **E. websteriana** subsp. **norsemanica**

1. Eucalyptus orbifolia F. Muell., Fragm. 5: 50 (1865). *Type citation:* Ad bases montium graniticorum Novae Hollandiae austro-occidentalis interioris, longitudine 119°25', latitudine 30°47'. C. Harper. *Type:* 30°47'S, 119°25'E, Western Australia, *C. Harper s.n.* (*holo:* MEL; *iso:* K).

Eucalyptus lata L.A.S. Johnson & K.D. Hill, *Telopea* 4(4): 630 (1992), *syn. nov. Type:* 13.6 km west of Callion on Mussions Soak road, Western Australia, 28 November 1986, *K.D. Hill* 2658 & *L.A.S. Johnson* (*holo:* NSW; *iso:* CANB, CBG, MEL, PERTH).

Notes. Distinguished within the series by the combination of pruinose branchlets, buds and fruits; the bluish, orbicular adult leaves (mostly broader than long; 35–55 mm long by 25–60 mm wide); the large buds (10–14 mm long) with a conic to beaked operculum and the large fruits (12–17 mm wide), often flared at the rim and therefore campanulate rather than hemispherical.

Eucalyptus orbifolia, as now recognized, is endemic to the goldfields region of Western Australia being bounded approximately by Youanmi in the north, Mt Gibson in the west, Bullfinch in the south and Menzies in the east (Figure 1). Its distribution is to the west of, and allopatric with, that of its closest relatives *E. minniritchi* and *E. websteriana*, but is completely sympatric with *E. ewartiana* and partially sympatric with *E. crucis* Maiden (subspp. *lanceolata* Brooker & Hopper and *praecipua* Brooker & Hopper). Hybrids of *E. orbifolia* with any other taxon of *E.* ser. *Orbifoliae* are unknown.

2. Eucalyptus minniritchi Nicolle, *sp. nov.*

Frutex 'mallee' effusus ad *Eucalyptum* seriem *Orbifolias* Brooker & Hopper pertinens, ad 3 m altus, cortice 'minniritchi' omnino. Ramulosi glauci. Folia adulta petiolata, alternantia, obovata vel orbicularia, emarginata, pro parte maxima longiora quam latiora, 18–46 mm x 10–35 mm, hebetia, cinerea, subglauca. Inflorescentiae axillares, simplices, 7-florae. Pedunculi 6–22 mm longi, pedicellis 2.5–8 mm longis. Alabastra glauca, 6–10 mm x 5–8 mm, hypanthium hemisphericum vel cupulatum, operculum hemispherici. Fructus glauci, pedicellati, hemispherici vel complanati-hemispherici, 7–10 mm x 8–16 mm.

Typus: southern slope of Mt Deering, Dean Range, Petermann Ranges, Western Australia, 25°07'12"S, 128°54'28"E, 14 July 1999, *D. Nicolle* 2692 & *J. Connors* (*holo:* PERTH; *iso:* AD, CANB, NSW, DNA).

Spreading *mallee*, often of dense habit, 2–3 m tall. Bark of the minniritchi type, glossy, red-brown to grey, decorticating in longitudinally split, thin strips that curl back and remain partially attached, revealing smooth reddish, greenish or yellowish brown bark beneath. Forming *lignotubers. Branchlets* pruinose, pith glands absent. *Cotyledons* bisected. *Seedling leaves* opposite at first, soon becoming ?alternate, petiolate, ovate at first, later becoming orbicular and emarginate, to 35 mm long, to 30 mm wide, concolorous, dull, bluish. *Adult leaves* sometimes pruinose, especially on new growth, alternate?, with petiole 7–18 mm long, blade elliptic to obovate and emarginate, tip very bluntly apiculate to strongly emarginate, 18–46 mm long, 10–35 mm wide, concolorous, dull, grey or bluish; reticulation dense, oil glands scattered to abundant, moderately large, irregularly-shaped, mostly at intersections of veinlets. *Inflorescences* axillary, unbranched, mostly 7-flowered; peduncles not greatly thickened, flattened and slightly widening towards summit, 6–20 mm long; pedicels terete, 2.5–8 mm long. *Buds* pruinose, globose to ovoid, 6–10 mm long, 5–8 mm diam.; operculum hemispherical (or bluntly conic, especially when immature), 5–6 mm long, apiculate to rounded, +smooth, scar present. *Stamens* very pale yellow, irregularly flexed, all fertile; anthers yellow, dorsifixed, ovoid, opening by lateral pores. *Flowers* pale creamy yellow. *Ovules* in 4 vertical rows. *Fruits* usually pruinose, especially when young, pedicellate, broadly obconic to hemispherical (not including the disc), 7–10 mm long, 8–16 mm diam., smooth; disc slightly ascending to prominently ascending, 2–5 mm wide; operculum scar to 1 mm wide; valves 4 or 5, exserted. *Seeds* angular-ovoid, dull to slightly glossy, grey-brown to almost black, finely reticulate; chaff linear, red-brown.

Selected specimens examined: WESTERN AUSTRALIA: type locality, 14 July 1999, *D. Nicolle 2687 & J. Connors* (PERTH, AD, CANB).
SOUTH AUSTRALIA: upper Slopes of Mt. Woodroofe, 11 Aug. 1962, *D.E. Symon 2693* (AD, NSW); upper Alalka Creek, on summit of hill at *c.* 4000 ft [1220 m], 19 May 1983, *R. Bates 3028* (AD); Musgrave Range, slope of Mt Woodroofe 3/4 way up, 17 Apr. 1950, *J.B. Cleland s.n.* (AD, BRI).
NORTHERN TERRITORY: near summit of Mt Hermannsburg, MacDonnell Ranges, 24°00'S, 132°39'E, 19 Apr. 1995, *D. Nicolle* 1354 (AD); Mt Sonder, 24 Nov. 1988, *B.G. Thomson* 2713 (AD, DNA, NT); Mannana Range, Petermann Reserve, 24°56'S, 129°17'E, 10 Sep. 1978, *P.K. Latz* 8035 (AD, NT).

Distribution and habitat. Most collections are from the MacDonnell Ranges in the vicinity of Mt Zeil south to the Krichauff Range in the Northern Territory. It also has a more poorly collected occurrence to the south and west, recorded from the Petermann Ranges (Mannanana Range in the Northern Territory and the Dean Range on the border between Western Australian and Northern Territory) and the Musgrave Ranges in far north-western South Australia (Figure 1). It occurs on the slopes and ridges of sandstone hills in gravelly or shalely skeletal soils in open mallee shrubland with *Triodia* understorey. Associated eucalypt species include *Corymbia eremaea* (D.J. Carr & S.G.M. Carr) K.D. Hill & L.A.S. Johnson (subspp. *eremaea* and *oligocarpa* (Blakely & Jacobs) K.D. Hill & L.A.S. Johnson), *E. sessilis* (Maiden) Blakely, *E. trivalvis* Blakely, *E. gillenii* Ewart & Kerr and *E. lucens* Brooker & Dunlop.

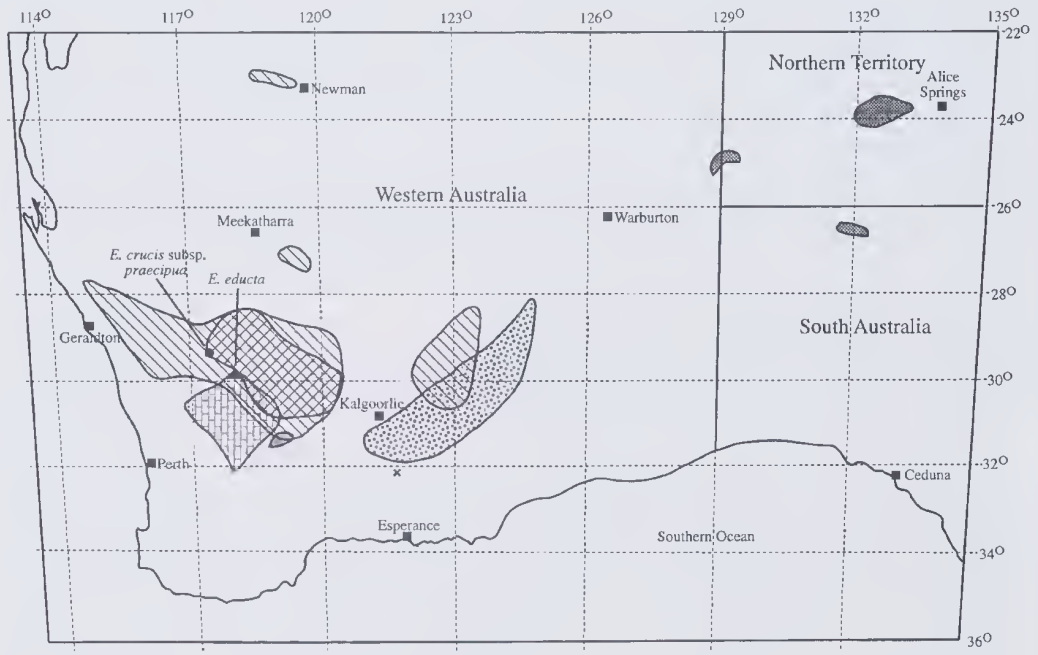

Figure 1. Distribution of *Eucalyptus* series *Orbifoliae*

E. crucis subsp. *crucis*
E. crucis subsp. *lanceolata*
E. crucis subsp. *praecipua*
E. educta
E. ewartiana
E. minniritchi
E. orbifolia
E. websteriana subsp. *norsemanica*
E. websteriana subsp. *websteriana*

Conservation status. Of scattered occurrence although usually locally common, in remote and inaccessible areas where it is not considered to be under any threat. Known from several conserved areas in the MacDonnell Ranges west of Alice Springs, while most other populations occur on tribally owned lands.

Flowering period. Poorly known. Recorded in flower in June.

Etymology. The specific epithet refers to the bark type of this species, and although common to all taxa of *Eucalyptus* ser. *Orbifoliae* and also present in the monospecific *E.* ser. *Caesiae* Brooker & Hopper, it is the only species with minniritchi bark occurring outside of Western Australia.

Notes. Distinguished within the series by the combination of pruinose branchlets; the petiolate, bluish, obovate to retuse adult leaves (20–50 mm long by 15–32 mm wide) that are usually longer than wide; the pruinose, small buds (6–7 mm long by 5–6.5 mm wide) with a short, hemispherical operculum and the pruinose, medium-sized fruits (relative to other taxa in the series; 8–9 mm long by 9–15 mm wide).

Eucalyptus minniritchi is in many characteristics intermediate in morphology between *E. orbifolia* and *E. websteriana*, although it is morphologically distinct from both (Table 1). In the strongly pruinose adult morphology, *E. minniritchi* is closest to *E. orbifolia*, while the bud morphology is more in common with *E. websteriana* (especially subsp. *websteriana).* In its leaf and fruit morphology *E. minniritchi* is intermediate between the other two species.

Discussion. There is some overlap in quantitative characters such as leaf, bud and fruit size within *Eucalyptus orbifolia, E. educta* L.A.S. Johnson & K.D. Hill, *E. minniritchi* and *E. websteriana* (including subsp. *norsemanica* L.A.S. Johnson & K.D. Hill), although these taxa are generally well defined by qualitative characters such as operculum and fruit shape that are relatively consistent throughout each taxon's distribution. Because of the variability and subsequent overlap of size of some characters between one or more of the above mentioned taxa, the five taxa could be equally well placed as five subspecies of *E. orbifolia.* However, specific status is preferred in order to show the equal relationship of *E. minniritchi* to both *E. orbifolia* and *E. websteriana* while at the same time maintaining a more resolved classification by indicating the lower degree of distinctiveness of *E. websteriana* subspp. *websteriana* and *norsemanica* to one another than to other members of the series. Specific status for the central Australian populations, described here as a new species, was also adopted by Hill and Johnson (1992) when they erroneously described *E. lata.*

In order to produce a more informative classification, *Eucalyptus educta* may be best placed as a subspecies of *E. orbifolia.* Typical *E. educta*, is known from a single population of only a few plants, perhaps a single genetic individual, covering a very small area that is geographically at the western edge of the distribution of *E. orbifolia.* Some atypical individuals (and possibly populations) of *E. orbifolia* collected away from the type locality of *E. educta*, but within the distribution of typical *E. orbifolia*, possess characteristics tending towards those seen in *E. educta*, such as a very long operculum (e.g. *D. Nicolle* 335, near Callion, Western Australia). It is not known if such collections represent morphological variability within *E. orbifolia* and thus morphological overlap of diagnostic characters between *E. orbifolia* and *E. educta* or are intergrades between these two species. Although subspecific status for *E. educta* (within *E. orbifolia*) may well be a more accurate representation of the former taxon's relationship within the series, the combination is not made here, judgement for such requiring further survey and research to establish the true identity and origin of *E. educta.*

Table 1. Differentiating characters between *E. orbifolia*, *E. minniritchi* and *E. websteriana*.

Taxon	*E. orbifolia*	*E. minniritchi*	*E. websteriana*
Distribution	northern to central goldfields of Western Australia	Central Ranges of the Northern Territory, South Australia and Western Australia	eastern and southern goldfields and western Great Victoria Desert of Western Australia
Pruinosity	branchlets, buds and fruits prominently pruinose	branchlets, buds and fruits prominently pruinose	branchlets and buds lightly pruinose in subsp. *websteriana*
Adult leaf shape	orbicular, mostly broader than long	obovate to retuse, mostly longer than broad	obovate to retuse, always longer than broad
Adult leaf size	35–55 mm long 25–60 mm wide	18–46 mm long 10–35 mm wide	15–40 mm long 12–30 mm wide
Peduncles	thick, 6–22 mm long	6–20 mm long	slender, 8–17 mm long
Pedicel	thick, 1–6 mm long	2.5–8 mm long	slender, 3–8 mm long
Bud size	10–14 mm long 8–9 mm wide	6–8 mm long 5–8 mm wide	5–8 mm long 5–6 mm wide
Operculum shape	conic to beaked	hemispherical	hemispherical
Fruit size	7–10 mm long 12–17 mm wide	7–10 mm long 8–16 mm wide	5–7 mm long 8–12 mm wide
Fruit shape	hemispherical to campanulate	hemispherical	hemispherical

Acknowledgements

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